AMENDMENTS TO THE SPECIFICATION

IN THE TITLE OF THE INVENTION:

Please amend the title of the invention as follows:

OPTICAL WAVELENGTH DIVISION MULTIPLEXING TRANSMISSION SUPPRESSING FOUR-WAVE MIXING AND SPM-GVD EFFECTS

IN THE SPECIFICATION:

Please replace the paragraph beginning on page 1, line 11 and ending on line 17 of the same page with the following rewritten paragraph.

In recent years, with still more expanding expectations for development of an optical communication technique to provide [[a]] high bit rate s, large capacity transmission path as an infrastructure of the information-oriented society, there have been promoted global and vigorous researches and developments of high rate, large capacity optical communication systems.

Please replace the paragraph beginning on page 1, line 18 and ending on line 22 of the same page with the following rewritten paragraph.

On ~~the~~ land, an optical wavelength division multiplexing transmission system of a 10 Gb/s transmission rate using a

transmission path of a 1.3 μm band single mode fiber (SMF) and a 1.55 μm band dispersion shift fiber (DFS) has come in<u>to</u> practice.

Please replace the paragraph beginning on page 1, line 23 and ending on page 2, line 2 with the following rewritten paragraph.

Under the ocean, on the other hand, an optical wavelength division multiplexing transmission system of a 10 Gb/s transmission rate using a transmission path of a non-zero dispersion shift fiber having a zero-dispersion wavelength at a 1.58 μm band has come in<u>to</u> practice.

Please replace the paragraph beginning on page 2, line 3 and ending on line 10 of the same page with the following rewritten paragraph.

Generally, ~~there occurs~~ a transmission waveform deterioration <u>occurs</u> in the optical fiber due to interaction (called SPM-GVD effect) between a self-phase modulation (SPM) and a group-velocity dispersion (GVD). Therefore, a possibly smaller value should be set as a value of the (group-velocity)

dispersion to be caused by a difference in transmission time in optical fiber between optical signals of different ~~of~~ wavelength.

Please replace the paragraph beginning on page 7, line 15 and ending on line 17 of the same page with the following rewritten paragraph.

Thus, ~~there can be implemented~~ a connection-less simplified structure can be implemented for structural integration of the two networks (transmission paths).

Please replace the paragraph beginning on page 7, line 18 and ending on page 8, line 5 with the following rewritten paragraph.

As explained above, ~~an~~ the optical repeater 1 is provided between ~~a~~ the first optical fiber transmission path 2 and ~~a~~ the second optical fiber transmission path 3, wherein the second optical fiber transmission path 3 has ~~having~~ a zero-dispersion wavelength different from the first optical fiber transmission path 2. This optical repeater 1 wavelength-converts with respect to respective wavelengths a wavelength division multiplex signal input from the first optical fiber transmission path 2, and output the result to the second optical fiber

transmission path 3. Therefore, the SPM-GVD effect and FWM in the second optical fiber transmission path 3 are minimized, thereby implementing a connection-less simplified structure for structural integration of the two networks (transmission paths).

Please replace the paragraph beginning on page 8, line 17 and ending on line 20 of the same page with the following rewritten paragraph.

Thus, ~~Even~~ with the second embodiment, ~~there can be implemented~~ a connection-less simplified structure can be implemented for structural integration of the two networks (transmission paths).

Please replace the paragraph beginning on page 9, line 7 and ending on line 11 of the same page with the following rewritten paragraph.

Because the optical amplifier 8 is inserted after every wavelength converter 6, the gain of each optical amplifier 8 is individually adjustable ~~in dependence~~ depending on a wavelength conversion efficiency of associated wavelength, thereby permitting compensation of an optical loss.

Please replace the paragraph beginning on page 10, line 4 and ending on line 13 of the same page with the following rewritten paragraph.

Fig. 9 shows a wavelength converter 63 according to a sixth embodiment. This wavelength converter 62 63 may be used in place of the wave converters 6 in any of the first to fourth embodiments. The wavelength converter 63 comprises a wavelength converting element 11 105 operative with a control signal to have a non-linear optical effect for converting an input optical signal λi into another wavelength $\lambda i'$. The wavelength converting element 11 105 may be a semiconductor optical amplifier, electric field absorption type modulator, optical fiber, or the like.

Please replace the paragraph beginning on page 11, line 4 and ending on line 8 of the same page with the following rewritten paragraph.

Fig. 11 shows a wavelength converting element 112, that uses an electric field absorption type modulator, according to an eighth embodiment. This wavelength converting element 112 may be used in place of the wavelength converting element 11 105 in the sixth embodiment.

Please replace the paragraph beginning on page 11, line 20 and ending on line 23 of the same page with the following rewritten paragraph.

Fig. 12 shows a wavelength converting element 113, that uses an optical fiber, according to a ninth embodiment. This wavelength converting element 113 may be used in place of the wavelength converting element ~~11~~ 105 in the sixth embodiment.

Please replace the paragraph beginning on page 11, line 24 and ending on page 12, line 8 with the following rewritten paragraph.

Legend 17 denotes ~~the~~ an optical fiber. The other elements are same as those shown in Fig. 10, therefore, their explanation will be omitted. An optical signal (wavelength: λi) input to the wavelength converting element 113 is combined at the photo-coupler 13 with excited light (wavelength: λp) from the light source 12, to strike the optical fiber 17, which then generates a new wavelength-converted optical signal (wavelength: $\lambda i'$) by way of a four-wave mixing. Only the wavelength-converted optical signal is filtered by the optical filter 14, to be output.

Please replace the paragraph beginning on page 12, line 18 and ending on line 24 of the same page with the following rewritten paragraph.

Fig. 13A and Fig. 13B show examples of wavelength layout in any of the optical repeaters 1, 11, 21, 31, and 61. Fig. 13A is a graph of wavelength layout of an optical input signal in the optical repeater [[1]] provided with a wavelength converter. Relative to a zero-dispersion wavelength $\lambda 0$ of an optical fiber, n waves having wavelengths $\lambda 1$ to λn are laid out so that the SPM-GVD effect and FWM of their wavelengths are minimized.

Please replace the paragraph beginning on page 12, line 25 and ending on page 13, line 6 with the following rewritten paragraph.

Fig. 13B is a graph of wavelength layout of an optical output signal in the optical repeater [[1]] provided with the wavelength converter. This signal is wavelength-converted so as to minimize the SPM-GVD effect and FWM relative to a zero-dispersion wavelength $\lambda 0'$ of an optical fiber, to have wavelengths laid out at uneven intervals, thus achieving like effects to the first embodiment.

Please replace the paragraph beginning on page 13, line 7 and ending on line 9 of the same page with the following rewritten paragraph.

The eleventh embodiment corresponds to a case of changing the wavelength intervals in the optical repeater [[1]] from an uneven interval layout to an even interval layout.

Please replace the paragraph beginning on page 13, line 10 and ending on line 17 of the same page with the following rewritten paragraph.

Fig. 14A and Fig. 14B show examples of wavelength layout in the optical repeater [[1]]. Fig. 14A is a graph of wavelength layout of an optical input signal in the optical repeater [[1]] provided with a wavelength converter. Relative to a zero-dispersion wavelength $\lambda 0$ of an optical fiber, n waves having wavelengths $\lambda 1$ to λn are laid out at uneven intervals so that the SPM-GVD effect and FWM of their wavelengths are minimized.

Please replace the paragraph beginning on page 13, line 18 and ending on line 24 of the same page with the following rewritten paragraph.

Fig. 14B is a graph of wavelength layout of an optical output signal in the optical repeater [[1]] provided with the wavelength converter. This signal is wavelength-converted so as to minimize the SPM-GVD effect and FWM relative to a zero-dispersion wavelength $\lambda 0'$ of an optical fiber, to have wavelengths laid out at even intervals, ~~thus achieving like effects to the first embodiment~~.

Please replace the paragraph beginning on page 13, line 25 and ending on page 14, line 2 with the following rewritten paragraph.

The twelfth embodiment corresponds to a case of changing the wavelength intervals in the optical repeater [[1]] from a constant value $\Delta\lambda$ to another constant value $\Delta\lambda'$.

Please replace the paragraph beginning on page 14, line 3 and ending on line 9 of the same page with the following rewritten paragraph.

Fig. 15A and Fig. 15B show examples of wavelength layout of the optical repeater [[1]]. Fig. 15A is a graph of wavelength layout of an optical input signal in the optical repeater [[1]]. Relative to a zero-dispersion wavelength $\lambda 0$ of the optical fiber 2, n waves having wavelengths $\lambda 1$ to λn are laid out at wavelength intervals of $\Delta\lambda$ so that the SPM-GVD effect and FWM of their wavelengths are minimized.

Please replace the paragraph beginning on page 14, line 10 and ending on line 16 of the same page with the following rewritten paragraph.

Fig. 15B is a graph of wavelength layout of an optical output signal in the optical repeater [[1]]. This signal is wavelength-converted so as to minimize the SPM-GVD effect and FWM relative to a zero-dispersion wavelength $\lambda 0'$ of the optical fiber 3, to have wavelengths laid out at changed intervals of $\Delta\lambda'$, thus achieving like effects to the first embodiment.

Please replace the paragraph beginning on page 14, line 17 and ending on line 19 of the same page with the following rewritten paragraph.

The thirteenth embodiment corresponds to a case of changing the number of wavelengths in the optical repeater [[1]] by a branching or insertion of wavelength.

Please replace the paragraph beginning on page 14, line 20 and ending on page 15, line 1 with the following rewritten paragraph.

Fig. 16A and Fig. 16B show examples of wavelength layout of the optical repeater [[1]]. Fig. 16A is a graph of wavelength layout of an optical input signal in the optical repeater [[1]]. Relative to a zero-dispersion wavelength $\lambda 0$ of the optical fiber 2, n waves having wavelengths $\lambda 1$ to λn are laid out so that the SPM-GVD effect and FWM of their wavelengths are minimized.

Please replace the paragraph beginning on page 15, line 2 and ending on line 8 of the same page with the following rewritten paragraph.

Fig. 16B is a graph of wavelength layout of an optical output signal in the optical repeater [[1]]. This signal is

wavelength-converted to have wavelengths branched or inserted to be laid out so as to minimize the SPM-GVD effect and FWM relative to a zero-dispersion wavelength $\lambda 0'$ of the optical fiber 3, thus achieving like effects to the first embodiment.